

Claims

1. An inorganic resin composition which comprises, in combination, a strongly acidic aqueous solution of metal phosphate (component A), an oxy-boron compound (component B) and a wollastonite compound (component C).

2. A composition according to claim 1 wherein the metal phosphate is selected from the group consisting of aluminium phosphates, zirconium phosphates, magnesium phosphates, zinc phosphates, calcium phosphates, iron phosphates, including derivatives and mixtures thereof.

a 3. A composition according to claim 1 or 2 wherein said oxy-boron compound is selected from the group consisting of boric acid, alkali metal and alkaline-earth metal salts of boric acid, amine and ammonium salts of boric acid, including hydrates and mixtures thereof.

4. A composition according to claim 3 wherein said oxy-boron compound is selected from the group consisting of boric acid, sodium borate, ammonium borate, calcium borate, including hydrates and mixtures thereof.

a 20 5. A composition according to claim 3 or 4 wherein said oxy-boron compound is as a powder or a liquid.

6. A composition according to claim 1 wherein said wollastonite compound is a natural or synthetic wollastonite, in calcined or non-calcined state, or a combination thereof.

a 25 7. A composition according to any one of claims 1 to 6 wherein said component A comprises, per 100 parts by weight of said wollastonite compound calculated on a basis of pure calcium silicate:

30 the equivalent of 14 to 135 parts by weight of phosphorous pentoxide contained in said metal phosphate, and the equivalent of 2 to 65 parts by weight of metal oxide contained in said metal phosphate.

35 8. A composition according to claim 7 wherein said component A comprises:

the equivalent of 24 to 86 parts by weight of phosphorous pentoxide, and

the equivalent of 5 to 47 parts by weight of metal oxide.

5 9. A composition according to any one of claims 1 to 8 wherein the whole water content of the composition is from 8 to 150 parts by weight per 100 parts by weight of said wollastonite compound calculated on a basis of pure calcium silicate.

10 10. A composition according to claim 9 wherein the whole water content of the composition is from 11 to 95 parts by weight.

15 11. A composition according to any one of claims 1 to 10 wherein said oxy-boron compound is present, calculated on an anhydrous basis, in an amount of 0.2 to 50 parts by weight per 100 parts by weight of said wollastonite compound calculated on a basis of pure calcium silicate.

20 12. A composition according to claim 11 wherein said oxy-boron compound, calculated on an anhydrous basis, is present in an amount of 2 to 20 parts by weight.

25 13. A composition according to any one of claims 6 to 12 wherein the particle size and the aspect ratio of the wollastonite are not larger than 150 μm and 10 respectively.

14. A composition according to any one of the claims 1 to 13 which comprises at least additives such as fibres, a filler, a foaming agent, a surfactant, and a pigment, used either alone or in combination thereof.

30 15. A composition according to claim 14 wherein said surfactant is zinc stearate.

35 16. A composition according to claim 14 or 15 wherein said foaming agent is a carbonate selected from the group consisting of calcium carbonate, magnesium carbonate, sodium carbonate, potassium carbonate, used either as powder or aqueous solution, or a combination thereof.

17. A composition according to any one of claims 14 to 16 wherein said filler is silica or a derivative thereof.

18. A composition according to any one of claims 14 to 17 wherein said fibre is selected from the group consisting of metal fibre, organic fibre, and inorganic fibre including glass fibre.

19. A process for preparing said strongly acidic aqueous solution of metal phosphate of said composition according to any one of claims 1 to 18 which comprises mixing metal and/or metal oxide and/or metal phosphate including hydrates and derivatives thereof in phosphoric acid aqueous solution at a temperature and for a time sufficient to form at least a semi-transparent solution.

20. A process for preparing a product of the inorganic resin composition according to any one of claims 1 to 19, which comprises:

mixing said strongly acidic aqueous solution of metal phosphate with said oxy-boron compound at a temperature and for a time sufficient to form an aqueous solution, and

contacting said wollastonite compound and optionally one or more of said additives with the above solution to form a slurry, and

25 bringing said slurry on a surface capable of at least partially supporting said slurry wherein said slurry reacts to set as a shaped product of the inorganic resin composition.

21. A process for preparing a prepreg product of said inorganic resin composition according to any one of claims 1 to 19, which comprises:

mixing said component A, said component B, said component C and optionally one or more of said additives to form a slurry, and

impregnating fibres with said slurry, and

keeping the impregnated fibres, which is called prepreg, at a temperature sufficiently low to prevent any setting reaction, and

bringing said prepreg on a surface capable of supporting
5 said prepreg wherein the slurry reacts to set as a shaped
product of said prepreg.

22. A process according to claim 20 or 21
wherein said slurry is kept at a temperature sufficiently
low to retard any setting reaction before being brought on
10 said supporting surface.

23. A process according to ~~any one of~~ claims 20 to 22 wherein said supporting surface comprises fibres including inorganic, organic and/or metallic fibres.

24. A process according to any one of claims 20
15 to 23 wherein said slurry impregnates said fibres of said
supporting surface to form a fibre reinforced product

25. A process according to any one of claims 20 to 22 wherein said supporting surface is made of metal, organic, or inorganic material.

20 26. Use of an inorganic resin composition according to any one of claims 1 to 19 and/or a shaped product of the inorganic resin composition prepared by the process according to any one of claims 20 to 25, as a binder, coating, surfacing agent, adhesive, cementing agent.

25 27. Use according to claim 26 wherein the shaped
product has a foamed structure.

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